



WolframAlpha: What IS It and How Will It Affect You?

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WolframAlpha (WIA) is a “computational search engine” built by Wolfram Research (the developers of Mathematica). WIA (pronounce this as “walpha”) is similar in appearance to the search engines that we are used to and easy to use. WIA will not replace other search engines. It’s more of a missing piece in the search engine puzzle. WIA provides a collection of data, formulas, computations, and interpretations that are different from other search engines.

Recent media releases have stressed data-driven examples (for example, type your first name to see a graph of the frequency of that name over time), the ability of WIA to function as a combination of CAS, and natural language computational system is stunning. Here are a couple of examples for you to try yourself. Go to the WIA website (www.wolframalpha.com) and type in each of the following as your search request:

- 126 (make sure to click on “other historical numerals”)
- convert 125 m³ to gallons
- sphere r=7 cm
- Line (2,7) and (3,1/2)
- Solve $x^2-6x=16$ (make sure to click on “show steps”)
- $4 - x^2$
- Triangle 7,8,9
- $x^2-y^2=9$
- limit $x \rightarrow 3 (x-3)/(x^2-9)$ (again, make sure to click on “show steps”)
- integral $(x^2)\sin(x^3)$ (“show steps”)
- sum $1/n^2$
- New York City, Chicago
- convert 78 to base 5

There are several differences between WIA and traditional CAS systems. The first, which you should have noticed after those examples, is that the **less** you ask for, the **more** you get. WIA just assumes you want all relevant computations and information that it can generate: graphs, solutions, alternate forms, derivatives, integrals, area under the curve (if bounded), and steps (if they are available). WIA provides quick and painless access to all sorts of data that has been organized so that it can be cross-referenced. In this sense, WIA could be a valuable tool for us in helping students to see the connections between concepts within mathematics and in relating mathematics to the real world.

On the other hand, there could be implications with academic dishonesty, especially in online and hybrid courses. It will be necessary to decide as an individual faculty member whether WIA is off limits, and if so, how to use and/or enforce it. Ready or not, WIA is now available on any computer with Internet access and on most SmartPhones.

It is up to each faculty member and department to think about (with as much advanced notice as possible) how to embrace, adopt, accommodate, and/or regulate the use of WIA in mathematics courses. This is a conversation that should occur in every department at every level of mathematics, including both full-time and part-time instructors. It is a conversation that should take place with colleagues in the partner disciplines and at four-year institutions.

Note: There are additional resources you may wish to view. A longer analysis regarding the rate of adoption and the impact of large-scale change in mathematics on the higher education system can be found at www.teachingcollegemath.com/?p=998. A wiki documenting some of the capabilities of WIA for math courses and the implications for teaching has been started at www.walphawiki.wikidot.com (maintained by Derek Bruff).

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